



BENEFITS

- ➔ Suited for larger structures

APPLICATIONS

- ➔ Flexible space structures
- ➔ Flexible solar panels

Materials and Coatings

Rolled Electroactive Polymer Actuators

For membrane tension control

NASA's Langley Research Center has invented technology that enables fine control of the tension of membrane structures. Originally developed for use with flexible, membrane-based space structures such as reflectors and solar collectors, the core of this technology is a cylindrical actuator referred to as a rolled electrostrictive polymer actuator. The actuator consists of a flat piece of electrostrictive polymer with electrodes attached to both sides so that a voltage can be applied across the material. To form the actuator, the flat piece of material is rolled and end caps are applied when the material is tightly rolled into a pre-strained condition. When a voltage is applied, the actuator experiences displacement along its longest dimension.

technology solution



NASA Technology Transfer Program

Bringing NASA Technology Down to Earth

THE TECHNOLOGY

To control membrane tension, the actuator is deployed between a frame and the flexible membrane, and attached to both. Application of a voltage to the actuator causes the actuator to shorten, increasing tension on the membrane. Currently, tension in most membrane structures is controlled with springs, which provide a robust but static method of tension control. Use of this actuator allows for dynamic control of the tension in the structure, which could be useful in deployable space structures. The actuator also acts as a sensor, and could be used in inflatable membrane structures to measure the tension in the membrane and make adjustments as necessary.



The technology could be applied to large, flexible solar panels.

PUBLICATIONS

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National Aeronautics and Space Administration

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